

**THE SOLID PUZZLE BLOCK****Technical Field**

5        The present invention relates to a solid puzzle block, and more particularly, to a solid puzzle block capable of side-connecting, cross-connecting, and connecting in a variety of ways.

**10      Background Art**

      Solid puzzle blocks come in many varieties and are generally used for developing intelligence and curiosity in babies. Because they lack connectors, solid puzzle blocks may be combined into a desired shape only by placing them 15      side-by-side or stacking them one on top of another.

      FIG. 1 is a perspective view of separated puzzle blocks of the prior art, and FIG. 2 is a perspective view of connected puzzle blocks of the prior art. FIGS. 1 and 2 will hereinafter be explained.

20      Puzzle blocks (A) of the prior art were developed to offer a 3-dimensional alternative to 2-dimensional picture puzzles. Regarding the structure and principles of such puzzle blocks, puzzle blocks come in a variety of polyhedral forms, where each surface of a polyhedron is painted in 25      various colors, or contain letters, characters, or various

images.

In order to connect the puzzle blocks (A), surfaces of individual puzzle blocks (A) may be mutually connected to form a solid conglomerate of multiple blocks. Also, images 5 on the surfaces may be used: for example, a letter on each puzzle block (A) may be joined to other letters on other puzzle blocks (A) to form a word.

In the case of such puzzle blocks (A), each puzzle block (A) lacks a connecting unit, and may only be stacked to 10 create a desired shape. Accordingly, there is a limit to the types of shapes that may be formed, and puzzle blocks (A) forming shapes may easily be dislodged from one another, so that a completed form is difficult to preserve intact for display purposes.

15 For these reasons, puzzle blocks (A) are enjoyed by babies, and are too simple to satisfy the needs of youths. Also, a set of puzzle blocks (A) often consists of about 100 differently shaped blocks to form a variety of shapes, thereby increasing the manufacturing cost of die-casting.

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#### **Disclosure**

#### **Technical Problem**

An object of the present invention is to provide a 25 solid puzzle block capable of side-connecting or cross-connecting to another block in a unitary or eccentric manner,

in order to produce a variety of shapes and reduce its manufacturing cost.

### **Technical Solution**

5        In order to achieve these objects, the polyhedral solid puzzle block of the present invention includes: a main body opened toward its top portion; a cap opened toward its bottom portion to be coupled to the main body; a connecting groove formed in the center of a side of the main body and the cap, 10 and open from the top to the bottom for allowing a solid puzzle block to be connected perpendicularly thereto; and a connecting peg and a connecting hole formed on each end of the side of the main body to allow another solid puzzle block to be fastened thereto.

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### **Advantageous Effects**

20        The solid puzzle block of the present invention may be side-connected to another block by means of the connecting peg and connecting hole, and firmly cross-connected to another block in a variety of ways by means of an embossed connecting groove and contacting portion. The solid puzzle block has a built-in light or sound-emitting device that operates when blocks are cross-connected, inducing amusement and curiosity and appealing to all age groups. Furthermore, 25 due to its simple structure, manufacturing cost is also

reduced.

#### **Description of Drawings**

FIG. 1 is a perspective view of separated puzzle blocks  
5 of the prior art;

FIG. 2 is a perspective view of connected puzzle blocks  
of the prior art;

FIG. 3 is a perspective view showing the side-connecting process of the solid puzzle block of the present  
.0 invention;

FIG. 4 is a perspective view showing the cross-connecting process of the solid puzzle block of the present invention;

FIG. 5 is a perspective view showing both side and  
.5 cross-connections of the solid puzzle block of the present invention;

FIG. 6 is an exploded perspective view showing the interior structure of the solid puzzle block of the present invention;

FIG. 7 is a perspective view showing an interior portion of the solid puzzle block of the present invention with a connector installed thereon;

FIG. 8 is a perspective view showing a side-connecting process using an I-connecting block of another embodiment of  
5 the present invention;

FIG. 9 is a sectional view showing a solid puzzle block side-connection using a fixed pin of yet another embodiment of the present invention;

FIG. 10 is a perspective view showing a solid puzzle block cross-connecting process using an insertion guide and an insertion groove of a further embodiment of the present invention; and

FIG. 11 is a perspective view showing a solid puzzle block cross-connecting process using a connecting groove and a slide groove of a still further embodiment of the present invention.

#### **Best Mode for Carrying out the Invention**

Hereinafter, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.

The solid puzzle block 1 of the present invention may be embodied in many forms; however, for simplicity's sake, a triangular plate-shaped block will be exemplified.

The solid puzzle block 1 has a main body 10 open at its top and a cap 30 open at its bottom and coupled to the main body 10.

A connecting groove 13 and 33 is respectively formed at the center of each side surface 11 and 31 of the main body 10 and cap 30 to open from top to bottom, so that a connecting

groove 13 and 33 of another solid puzzle block 1 may be attached thereto, attaching the two blocks perpendicularly to one another.

At each end of the side surface 11 of the main body 10 are formed a connecting peg 14 and a connecting hole 15 disposed at a position opposite to the connecting peg 14, in order to side-connect two solid puzzle blocks 1 along the same plane.

An operating unit 21 for emitting light or sound via a voltage from the outside is built inside the main body 10 and the cap 30.

The solid puzzle block 1 includes a connector 17 that is connected to the operating unit 21 through a wire, and around which an insulator 17-1 is fitted. When two connectors 17 of two different solid puzzle blocks 1 are coupled by perpendicularly connecting the two solid puzzle blocks 1, and the operating unit 21 of one solid puzzle block is powered on, the operating unit 21 of the other solid puzzle block is consequently powered on.

In order to install the connector 17, a receiving groove 18 and 38 is formed on the end surface 16 and 36 extending from the left side to the right side of the connecting groove 13 and 33 formed on the main body 10 and the cap 30.

A plurality of supports 20 is formed a predetermined

distance from the receiving groove 18 and 38. The insulator 17-1 of the connector 17 rests between the receiving groove 18 and 38 and supports 20 of the main body 10, so that the front of the connector 17 is disposed on the receiving groove 18 and 38 formed on the main body 10 and does not move back and forth, due to the connector 17 being firmly secured.

A tab hole 19 is defined on top of the support 20, and a screw hole 39 is bored on the cap 30 opposite the tab hole 19 in order to couple the main body 10 and the cap 30 via a screw 22, so that the front of the connector 17 is pressed by the matching receiving groove 18 and 38 to be firmly secured.

On the contacting portion 42 formed on the left and right surfaces of the connecting groove 13 and 33, the upper surface 40 around the screw hole 39, and the lower surface 41 on the opposite side of the block are embossings 12, to provide frictional surfaces for increasing the ability to couple two solid puzzle blocks 1 perpendicularly.

Different colors or relief images may be applied to the upper surface 40, lower surface 41, and side surfaces 11 and 31 of the solid puzzle blocks. That is, relief images can be formed on the upper and lower surfaces 40 and 41, whose indented areas may be filled with colorful fillers or have detachable images inserted therein for a wide range of possibilities.

Due to a connecting peg 14 of one solid puzzle block

inserting into a connecting hole 15 of another solid puzzle block 1, the two blocks may be coupled so that their respective upper and lower surfaces 40 and 41 are aligned on common planes.

5        The connecting peg 14 and the connecting hole 15 are manufactured to be transition fitted. This type of connection is called side-connecting.

10      By turning solid puzzle blocks 90° from one another and coupling their connecting grooves 13 and 33 together, their respective upper and lower surfaces 40 and 41 become mutually perpendicularly disposed.

15      Here, the left and right sides of the connecting groove 13 and 33 of one solid puzzle block 1 contact the contacting portions 42 of another solid puzzle block 1.

20      The embossing 12 on the left and right surfaces of the connecting groove 13 and 33 and the contacting portions 42 increase friction, thereby providing a firm coupling. This type of connection is called cross-connecting.

25      When cross-connecting is implemented, the respective connectors 17 contact one another; and when power is supplied through one connector 17, the respective operating units 21 for emitting light or sound are connected. Here, of course, power is supplied to a free connector 17 that is not coupled to another connector 17.

30      Accordingly, the above solid puzzle block 1 can form

simple shapes of regular puzzle blocks and a wide variety of more complex three-dimensional formations. Also, its surfaces can have various colors and images thereon, so that when a plurality of blocks are assembled, each color and 5 image collaborates with its connected counterparts to produce a wide assortment of puzzles. Through cross-connecting, light is emitted, or sound is emitted through speakers, arousing curiosity and interest in a user.

Therefore, all ages can enjoy the inventive block, 10 which can be used for decorative purposes, where connected images can be displayed over long periods of time. Also, because the blocks are uniformly shaped, their manufacturing cost is reduced, allowing users to enjoy a low-cost, but very difficult solid block puzzle. In addition, because the 15 blocks are the same shape, should a user lose blocks from a set, she or he can replace them at a low cost.

The solid puzzle block of the present invention can come in a wide assortment of sets, which do not require a large number of blocks per set to be satisfactorily enjoyed.

20 FIG. 8 is a perspective view of another embodiment of the present invention using a T-connection groove 51 formed on the side surfaces 11 and 31, which forms an I-shape when two T-connecting grooves 51 of different solid puzzle blocks 1 are positioned in an adjoining manner, instead of using a 25 connecting peg 14 and connecting hole 15.

By inserting an I-connecting block 52 into respective adjoining T-connection grooves 51 of two solid puzzle blocks 1, a solid side-connection is made. To make a cross-connection, the I-connecting block 52 is omitted, and two 5 respective T-connection grooves 51 of two blocks are mutually inserted at a 90° angle.

FIG. 9 shows another connecting embodiment of the present invention with a pin hole 62 formed in a cross section 61-1 at the end of the connecting groove 61 of the 10 side surface 11, and a fixing pin 63 that is inserted in a pin hole 62 of two solid puzzle blocks 1, forming a firm side-connection. The fixing pin 63 can also be used to establish a firm cross-connection. In the latter case, in order to operate a light or sound-emitting operating unit 21, 15 a wire or connector 17 for enabling the operation of the operating unit 21 is passes through the fixing pin 63.

FIG. 10 shows yet another cross-connecting embodiment of the present invention with an insertion guide 72 extending horizontally along the lengths of the left and right surfaces 20 of the connecting groove 71 formed on a side surface 11 of the solid puzzle block 1. An insertion groove 75 is formed at a right angle on the upper and lower surfaces 40 and 41 to run parallel to the insertion guide 72.

Accordingly, when cross-connecting two solid puzzle 25 blocks 1, each insertion guide 72 of a connecting groove 71

on one block fits over the insertion grooves 75 formed on the upper and lower surfaces 40 and 41 of the other block.

In this case, the insertion guide 72 is formed to fit snugly into the insertion groove 75 for a firm coupling.

5 FIG. 11 shows a further cross-connecting embodiment of the inventive solid puzzle block 1 with one of its several side surfaces 11 having a connecting groove 81 formed thereon opening from the top to the bottom, and the remaining side surfaces 11 and 31 each having a slide groove 82 oppositely formed on the upper and lower surfaces 40 and 41.

Accordingly, the left and right surfaces of the connecting groove 81 meet the slide grooves 82, forming a perpendicular cross-connection.

15 The width (B) of the connecting groove 81 is formed slightly smaller than the thickness (C) of the sliding groove 82, so that the two pieces can easily be assembled and disassembled by a person.

20 Width (B) is formed so that only one of either the upper surface 40 or the lower surface 41 has a slide groove 82 formed thereon, in order to create a tighter cross-connection.

25 A connector 17 is installed at the portion on the side surface 11 that perpendicularly meets with the slide groove 82, and is installed at the end surface 83 between the left and right sides of the connecting groove 81; thereby allowing

the operating unit 21 to operate by cross-connection. Furthermore, the operating unit 21 can operate by side-connecting respective side surfaces 11 and 31 of two blocks.

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#### **Industrial Applicability**

The solid puzzle block of the present invention, having the ability to firmly connect to one another and the same, unitary shape, not only constructs a wide assortment of shapes, but also uses an operating unit that emits light or sound.